

*Evidence of a Protozoëa Stage in Crab Development.*

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There is great interest attached to speculations as to the probable ancestry of the Decapods, owing to the value which the conclusions have in enabling us to interpret palæontological facts. There have been quite a number of theories advanced as to the original stem from which the Decapods have been derived, two of which claim especial attention. One is the theory of Müller, who finds such a stem-form in the zoëa. Another, suggested by Claus, or in a different form by Brooks, considers the protozoëa as the ancestral stem. It is of great importance in understanding the Crustacea to decide between these two views, inasmuch as by the first view Crustacea are supposed to have descended from a form without a thorax, while according to the second, the thorax was present in the original Decapod stem. Some work done at Hampton during the last summer upon the larval cuticle of crabs indicates conclusively that the latter view is the correct one, or that at least Fritz Müller's view is incorrect. The larval skin, particularly the telson, of a large number of crab zoëas was studied with the following results:—The larval skin is not in different crabs alike, nor is it in any case exactly similar to the enclosed zoëa. There is always an indication, more or less complete, of some previously existing stage. There has been shown in the various forms studied a gradation from the larval skin, with little difference from the zoëa enclosed, to a larval skin which is utterly unlike the zoëa, but which possesses a forked tail with fourteen long feathered spines. This gradation is complete, and a study of the different embryonic telsons shows that all have been derived from the form shown by *Panopeus*, which has a forked tail with fourteen spines. Now such a larval skin is to be considered simply as the cast-off skin of some stage immediately preceding the zoëa. It has been shown by Paul Meyer that the study of the larval skin of *Macrura* leads to a similar result; that a forked tail with fourteen spines is also seen in the early history of this group. If therefore a form can be found which shows these peculiarities, we have reason for accepting it as the stem-form of the higher Crustacea. Now a study of the different protozoëa-forms which occur in the ontogeny of various *Macrura* shows that we have in this form a stage which fulfils the conditions. It has the forked tail with fourteen spines, and has large swimming antennæ, another peculiar characteristic of the crab larval cuticle. If the various larval skins of crabs and *Macrura* be compared with each other, it will be seen that they are all to be considered as modifications of a tail much like that present in the larval skin of *Panopeus*; and if this tail be compared with the protozoëa-tail of *Peneus*, the likeness will be seen to be very striking. We have therefore, in the comparative study of the larval cuticle of crabs, good reason for accepting as the stem-form of the Decapods a form which had resemblance to a protozoëa.—*Johns Hopkins University Circulars*, Jan. 1884, p. 41.

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